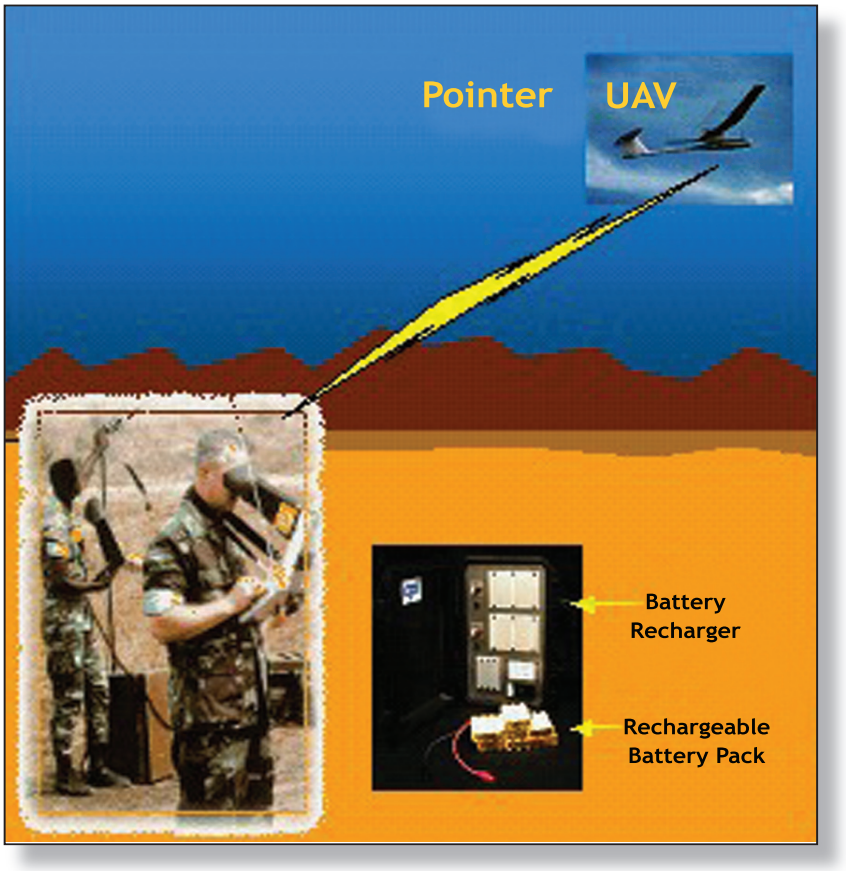
Air Force Research Laboratory|AFRL
Science and Technology for Tomorrow's Air and Space Force

Success Story

ADVANCED RECHARGEABLE BATTERY PROGRAM FOR POINTER UAV



The Munitions Directorate designed and built rechargeable battery packs in less than 45 days using the latest state-of-the-art lithium cells. The annual operating cost of rechargeable battery packs is far less than the current disposable battery packs' annual operating costs. The cost for one Pointer unmanned air vehicle (UAV) sortie using the old non-rechargeable lithium sulfide (LiSO2) battery packs, compared to the new lithium rechargeable pack, computes to a savings estimate of 60 to 1. Also, these new units will last for thousands of cycles, thus greatly increasing the field life of the system.

Air Force Research Laboratory
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Accomplishment

The directorate teamed with Compact Power, Inc. of Colorado, and the Propulsion Directorate to develop a rechargeable battery pack for the Air Force Special Operations Command (AFSOC) Pointer UAV, in response to Operations ENDURING FREEDOM and IRAQI FREEDOM. Both the rechargeable battery packs and the recharging unit provide an increase in operational utility and solve a major logistical challenge to operate the Pointer UAV in austere locations.

The recharging units are equally important to the new battery packs. Designed for field use, they run off all common forms of alternating current and direct current inputs. This gives the warfighter the ability to recharge the packs from just about any power source.

The recharger will also charge the packs in the same amount of time it takes to fly a typical Pointer UAV mission, which means as one pack is being flown, another pack is being charged for continuous flying operations. Since one recharger is capable of recharging two packs simultaneously, one recharger and four battery packs will keep two aircraft flying continuously.

Background

The problem of battery packs became a critical issue as the war in Iraq began. The current, non-rechargeable LiSO2 battery packs were used in a wide variety of military equipment. Production capability peaked out and shortages were beginning to occur. The Pointer UAV is a primary tool employed by AFSOC personnel for tactical targeting and reconnaissance, and the shortage of LiSO2 packs was impacting their operations in austere locations.

The solution to this problem was to design and build rechargeable battery packs in less than 45 days using the latest state-of-the-art 18650 lithium cell. The commercial industry has seen the 18650 cells improve dramatically from 1600 mAhr to the current 2200 mAhr, with a potential to rise to ~2800 mAhr in the coming years.

Using seven cells in a series per set and three sets in parallel, the combined 21-cell battery pack produces 6600 mAhr at a peak of 29.4 volts per direct current. The AFSOC Special Tactics Group is operationally flying the Pointer UAV and achieving greater increased flying time from the new rechargeable battery packs.

Munitions
Support to the Warfighter

Additional information

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